

What is claimed is:

1. An abrasive alloy comprising  
a material with a hardness over 20 GPa in combination with from about 5 vol. % to about 30 vol. % of a ductile binder phase of Co-Mn alloy.
2. The abrasive alloy of claim 1 wherein the material with a hardness over 20 GPa is selected from the group consisting of BN (cubic), SiC, Al<sub>2</sub>O<sub>3</sub>, TiB<sub>2</sub>, WC, TiC, AlB<sub>12</sub>, Si<sub>3</sub>N<sub>4</sub>, AlMgB<sub>14</sub>, Al<sub>z</sub>Si<sub>1-z</sub>MgB<sub>14</sub>, AlCr<sub>z</sub>Mg<sub>1-z</sub>B<sub>14</sub>, AlTi<sub>z</sub>Mg<sub>1-z</sub>B<sub>14</sub> and AlMgB<sub>14</sub>X where X is present in an amount of from 5 wt. % to 30 wt. % and comprises a doping agent from the group consisting of Group III, IV, V elements and borides and nitrides thereof and where  $1 \geq z \geq 0$ .
3. The abrasive alloy of claim 1 wherein the ductile binder phase is from about 10 vol. % to about 20 vol. % of a ductile binder of Co-Mn alloy.
4. The abrasive alloy of claim 1 wherein the ductile binder phase of Co-Mn alloy ranges from Co-5% (atomic) Mn alloy to Co-45% (atomic) Mn alloy.
5. The abrasive alloy of claim 4 wherein the ductile binder phase of Co-Mn alloy ranges from Co-17 % (atomic) Mn alloy to Co-38 % (atomic) Mn alloy.
6. A method of making an abrasive alloy, comprising:  
providing a material with a hardness over 20 GPa in powder form;  
providing a ductile binder phase of Co-Mn alloy in powder form;  
mixing the two powders together;

compacting the powders;  
sintering the powders; and  
cooling the product.

7. The method of claim 6 wherein the material with a hardness over 20 GPa is selected from the group consisting of C (diamond), BN (cubic),  $C_3N_4$  (cubic), SiC,  $Al_2O_3$ ,  $TiB_2$ , WC, TiC,  $AlB_{12}$ ,  $Si_3N_4$ ,  $AlMgB_{14}$ ,  $Al_zSi_{1-z}MgB_{14}$ ,  $AlCr_zMg_{1-z}B_{14}$ ,  $AlTi_zMg_{1-z}B_{14}$  and  $AlMgB_{14}X$  where X is present in an amount of from 5 wt. % to 30 wt. % and comprises a doping agent from the group consisting of Group III, IV, V elements and borides and nitrides thereof and where  $1 \geq z \geq 0$ .
8. The method of claim 6 wherein the ductile binder phase is from about 10 vol. % to about 20 vol. % of a ductile binder of Co-Mn alloy.
9. The method of claim 6 wherein the ductile binder phase of Co-Mn alloy ranges from Co-17 % (atomic) Mn alloy to Co-38 % (atomic) Mn alloy.
10. The method of claim 6 wherein densifying and sintering are performed simultaneously.
11. The method of claim 10 wherein the sintering temperature is from 800°C to 1400°C with applied pressure.